

## 5-5

A **function** is a relation in which each element of the domain is paired with exactly one element of the range.

Equations that are **functions** can be written in a form called **functional notation**,  $f(x)$  (read "f of x").

In a function,  $x$  is an element of the domain and  $f(x)$  is the corresponding element in the range.

## EXAMPLES

Is  $\{(1, 2), (1, 3)\}$  a function?

Is  $\{(1, 4), (3, 2), (5, 4)\}$  a function?

1st relation: not a function

This relation has 1 paired with both 2 & 3.

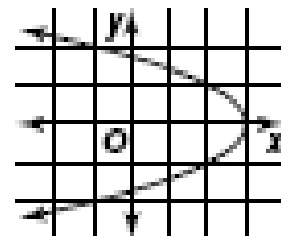
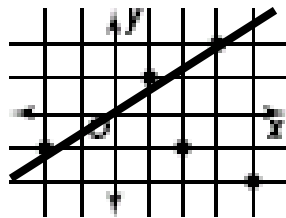
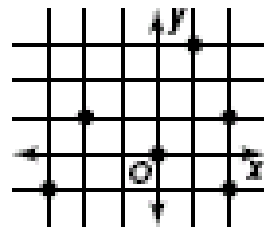
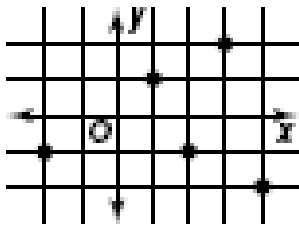
2nd relation: a function

In this relation, each x-value is paired with no more than one y-value.

However, a function can have a y-value paired with more than one x-value.

## Vertical Line Test

If each vertical line passes through no more than one point of the graph of a relation, then the relation is a function.



**Find each value:**

If  $f(x) = 3x - 1$  and  $g(x) = 2x$ ,  
find  $f(1)$  and  $g(3)$ .

$$f(x) = 3x - 1$$

$$f(1) = 3(1) - 1 \text{ or } 2$$

*Replace  $x$  with 1.*

$$g(x) = 2x$$

$$g(3) = 2(3) \text{ or } 6$$

*Replace  $x$  with 3.*